**Explanation Framework**

**Learning Sequence for Teaching & Practicing Scientific Explanations**

1. Make the framework explicit.

2. Model and critique explanations.

3. Provide a rationale for creating explanations.

4. Connect to everyday explanations.

5. Assess and provide feedback to students.

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**Rubric for Learning the Cl-Ev-R Scientific Explanation**

Claim

1. **Relevant** 🡪 The claim directly & clearly responds to the question.
2. **Stands-Alone** 🡪 The claim statement is complete (stands alone).



Evidence

1. **Appropriate** 🡪 Is this the right type of evidence for this claim?

(Discuss this in the “Reasoning” section.)

* 1. Validity: Measurements & observations are relevant.
  2. Validity: Controlled variables focus attention on key factors.

1. **Sufficient** 🡪 Is there enough evidence?
   1. Reliability: Repeated trials will increase confidence.
   2. Full Range: Enough different conditions/values of variables?
   3. Full Range: The explanation cites enough examples to represent the whole data set without being tedious.

Reasoning

1. **Stands-Out** 🡪 Is the reasoning obvious, or hard-to-spot?
   1. DO NOT repeat the Claim or the Question.
   2. DO NOT repeat the Evidence.
2. **Link** 🡪 Why this data should count as evidence.
   1. Why it’s the right type of measurement/observation.
   2. How the controls help to validate the link.
3. **Science Concept** 🡪 Use scientific concepts to connect reasoning to claim:
   1. Is this the right science concept to connect the reasoning to the claim?
   2. Is the science concept clear and correctly used?

Note: A fuller scientific explanation will also contain a “Rebuttal,” which describes alternative Claims, plus the Evidence and/or Reasoning that refute the alternative Claim.

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| **Elementary Guide for Scientific Explanations** | | | | |
|  | I Did It! | I’m Close | I Need Help | Oops |
| **Claim** | | | | |
| **Answers the question** | My claim directly & clearly responds to the question. | My claim responds directly **or** clearly to the question. | My claim does not respond to the question. | No claim statement. |
| **Stands-Alone**  **(One sentence)** | My claim stands alone as a complete statement. | My claim has a missing piece. | My claim is too vague or is missing pieces. |
| **Evidence** | | | | |
| **This is the “right” evidence** | My data is the right data to answer the question. | My data is mostly the right data to answer the question. | Most of my data is not the right data to answer the question. | No evidence cited. |
| **There is enough evidence** | I have just enough data but not so much that it is boring to read. | I have some evidence to support my claim but it doesn’t feel like enough. | I don’t have enough evidence to support my claim. |
| **Reasoning** | | | | |
| **The reasoning is easy to spot** | My reasoning statements are easy to find. | My reasoning statements are there but may be hard to find. | My reasoning just repeats the Claim, Question, or Evidence. | No reasoning statements. |
| **Why this evidence counts** | I explain why my evidence counts. | I hint at why my evidence counts. | I don’t explain why my evidence counts. |
| **Uses a science concept** | I use a science concept to explain why the evidence supports the claim. | I use a science concept but it may not explain why the evidence supports the claim. | I barely mention any science concepts. |

**Notes:**